

# COURSE GUIDE – short form

Academic year 2017/2018

Course name <sup>1</sup>	<b>Alloys manufacture bases</b>					Course code	2SM12DIS		
Course type <sup>2</sup>	DID	Category <sup>3</sup>	DI	Year of study	II	Semester	I	Number of credit points	3

Faculty	Materials Science and Engineering	Number of teaching and learning hours <sup>4</sup>					
Field	Materials Engineering	Total	L	T	LB	P	IS
Specialization	Materials Science	28	14	-	14	-	-

Pre-requisites from the curriculum <sup>5</sup>	Compulsory	Not applicable
	Recommended	Not applicable

General objective <sup>6</sup>	Processing of a metallic and non-metallic charge in the furnace and outside it, in view of obtaining of a smelting that to determine castings of performance.
Specific objectives <sup>7</sup>	Analysis, in detail, of general technological procedure of processing of a metallic and non-metallic charge, in a furnace and outside it, for obtaining of melting - charge preparing, furnace preparing, charging, smelting, superheating of the metallic bath, metallurgical treatment of the metallic bath (in furnace and outside it) and evacuation.

Course description <sup>8</sup>	<p>1./History of alloys manufacture, beginning with bronze and to superalloys</p> <p>2.Metalurgical system of manufacture</p> <p style="margin-left: 20px;">2.1. Structure</p> <p style="margin-left: 20px;">2.2. Interactions among parts of the metallurgical system – examples</p> <p style="margin-left: 20px;">2.3. Manufacture technological procedure – short presentation of the stages</p> <p>3. Charge preparation. Analytical calculation of the proportion of chemical element and metallic kinds from the charge</p> <p>4. Furnace preparation. Classification of the furnaces</p> <p style="margin-left: 20px;">4.1. Cupola. Sketch</p> <p style="margin-left: 20px;">4.2. Induction furnace. Sketch</p> <p style="margin-left: 20px;">4.3. Electric arc furnace. Sketch</p> <p>5. Furnace charging</p> <p>6. Smelting</p> <p style="margin-left: 20px;">6.1. Smelting mechanism</p> <p style="margin-left: 20px;">6.2. Oxidation processes</p> <p style="margin-left: 20px;">6.3. Slag – definition and formation</p> <p style="margin-left: 20px;">6.4. Smelting with total oxidation</p> <p style="margin-left: 20px;">6.5. Smelting with partial oxidation</p> <p style="margin-left: 20px;">6.6. Smelting without oxidation</p> <p style="margin-left: 20px;">6.7. Dephosphorization of ferrous alloys</p> <p>7. Superheating in liquid state</p> <p style="margin-left: 20px;">7.1. Role of the superheating and phenomena of reduction/oxidation – boiling</p> <p style="margin-left: 20px;">7.2. Desulphurization. Example for a ferrous metallic bath – with lime and Mn</p> <p style="margin-left: 20px;">7.3. Deoxidation by precipitation, diffusion and physical methods</p> <p style="margin-left: 20px;">7.4. Alloyage</p> <p>8. Evacuation</p> <p>9. Metallic bath treatment outside furnace</p> <p style="margin-left: 20px;">9.1. Bubbling with inert gases</p> <p style="margin-left: 20px;">9.2. Treatment with synthetic slags</p> <p style="margin-left: 20px;">9.3. Treatment in vacuum</p> <p style="margin-left: 20px;">9.4. Inoculation</p> <p style="margin-left: 40px;">There are 4 laboratory works.</p>
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Assessment		Schedule <sup>9</sup>	Percentage of the final grade (minimum grade) <sup>10</sup>
Continuous assessment	Class tests along the semester	W5, 10 and 14	10% (at least 5)
	Activity during laboratory works	W1-w14	40% (at least 5)
	Homework	W 12	10% (at least 5)
Final assessment	Final assessment form <sup>11</sup>   colloquium	W14	45% (at least 5)
	Examination procedures and conditions: Oral colloquium. Students must answer three subjects from the list of topics for the symposium, the list of topics with keywords was handed to students after the last lecture. Passing mark of the colloquium is at least 5 and is obtained by the arithmetic average of the marks received for three subjects. Marks received for two subjects must be at least 5. Oral colloquy takes place if the lab, home work and each of the three tests have a promotion mark of at least 5, only.		

Course organizer	Vasile Cojocaru Filipiuc, dr. ,eng., Prof.
Teaching assistants	Raluca Maria Florea, dr., eng., univ. assist.

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<sup>1</sup>Course name from the curriculum

<sup>2</sup> DF – fundamental, DID – in the field, DS – specialty, DC – complementary (from the curriculum)

<sup>3</sup> DI – imposed, DO –optional, DL – facultative (from the curriculum)

<sup>4</sup> Points 3.8, 3.5, 3.6a,b,c, 3.7 from the Course guide – extended form (L-lecture, T-tutorial, LB-laboratory works, P-project, IS-individual study)

<sup>5</sup> According to 4.1 – Pre-requisites - from the Course guide – extended form

<sup>6</sup> According to 7.1 from the Course guide – extended form

<sup>7</sup> According to 7.2 from the Course guide – extended form

<sup>8</sup> Short description of the course, according to point 8 from the Course guide – extended form

<sup>9</sup> For continuous assessment: weeks 1 – 14, for final assessment – colloquium: week 14, for final assessment-exam: exam period

<sup>10</sup> A minimum grade might be imposed for some assessment stages

<sup>11</sup> Exam or colloquium

20.09.2017